

REVISION AND APPLICATION OF COVARIANCE DATA PROCESSING CODE, ERRORJ

Gou Chiba, Makoto Ishikawa

Japan Nuclear Cycle Development Institute

It is important to evaluate an uncertainty of nuclear characteristics in the reactor core analysis field. For such kind of analysis, covariance data of cross sections are essential.

To apply the covariance data for the uncertainty analysis, group-averaged covariance data are necessary. The original ERRORJ code was developed based on ERRORR module in NJOY94.105 to obtain it by K. Kosako in 1999. ERRORJ can treat the covariance data of cross sections including resonance parameters, angular distributions and energy distributions of secondary neutrons which could not be dealt with by the former covariance processing codes.

ERRORJ has been modified in several calculation parts processing the average cosine of elastic scattering angle and the resonance parameters and ERRORJ version 2.2 will be released in near future. The revision of ERRORJ increases its reliability.

The newest ERRORJ was applied into processing covariance in several kinds of nuclear data files, such as JENDL, ENDF/B and JEFF. The processing had been done without problems. There was a large difference in the obtained group-averaged covariance data. We estimated the effect of the difference on uncertainties of nuclear parameters of fast reactor cores by introducing sensitivity coefficients. The results were very different to each other. For example, uncertainty of elastic scattering cross section of iron induces uncertainty on k_{eff} of JOYO MK-III core, which is $1.5\% \Delta k$ for JENDL-3.2 and $0.2\% \Delta k$ for ENDF/B-V. It is important and necessary to discuss further the methodology of the evaluation of the covariance data.